

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE  
 in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 16 March 2001 (16.03.01)	<b>Applicant's or agent's file reference</b> P384WO
<b>International application No.</b> PCT/GB00/02303	<b>Priority date (day/month/year)</b> 26 June 1999 (26.06.99)
<b>International filing date (day/month/year)</b> 26 June 2000 (26.06.00)	
<b>Applicant</b> AUSTIN, James, Leonard	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

22 January 2001 (22.01.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b> Juan Cruz Telephone No.: (41-22) 338.83.38
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# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>P384W0</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/ 02303</b>	International filing date (day/month/year) <b>26/06/2000</b>	(Earliest) Priority Date (day/month/year) <b>26/06/1999</b>
Applicant  <b>UNIVERSITY OF YORK</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

4

☐ None of the figures.

REC'D 31 AUG 2001

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>P384WO</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/GB00/02303</b>	International filing date (day/month/year) <b>26/06/2000</b>	Priority date (day/month/year) <b>26/06/1999</b>
International Patent Classification (IPC) or national classification and IPC <b>G06T1/60</b>		
Applicant <b>UNIVERSITY OF YORK et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  <b>22/01/2001</b>	Date of completion of this report  <b>29.08.2001</b>
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</b>	Authorized officer  <b>Casteller, M</b>  Telephone No. +49 89 2399 2666  

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02303

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, pages:**

1-35 as originally filed

**Claims, No.:**

1-22 as originally filed

**Drawings, sheets:**

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB00/02303

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 15-16, 20-22.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 15-16, 20-22 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)

Yes: Claims 1-14, 17-19

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02303

	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14, 17-19
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14, 17-19
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. Present independent claims 15, 16, 21 and 22 and dependent claim 20 contain explicit references to the entire description and at least one drawing. The skilled reader is left in a state of uncertainty as of which described features are meant to be protected by these claims.

These claims therefore not only explicitly contravene Rule 6.2(a) PCT, but are also so vague and broad that it is not even clear (Article 6 PCT) what subject-matter should be the subject of international preliminary examination.

Consequently, no assessment of novelty and inventive step appears possible for these claims.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

2. Reference is made to the following documents:

D1: US-A-4 958 377 (TAKAHASHI KOUSUKE), 18 September 1990

D2: YANG GUOQING et al.: "Multilayer parallel distributed pattern recognition system model using sparse RAM nets", IEE PROCEEDINGS-E (COMPUTERS AND DIGITAL TECHNIQUES), March 1992, UK, vol. 139, no. 2, pages 144-146, XP002146690, ISSN: 0143-7062

3. D1 describes an associative memory for storing a plurality of characters (strings) and deciding a best match between an input character (string) and those stored.

The associative memory can be divided into a plurality of areas (cf. cases (a), (b) and (c), column 7, lines 2-24) selectively accessed in dependance from (two) selection signals (SC1, SC2, cf. also column 9, lines 19-34). The actual number of areas into which the memory is dynamically divided ultimately depends from the length of the input character (string) (e.g. M, 2M, or 3M, cf. column 8, lines 28-40).

The selection signals themselves are not stored in the memory (column 10, lines 16-

19).

There is no mention in D1 neither of generation of tuples from the input data, nor of using data separators as suggested by the invention.

D2 at least mentions generating n-tuples subpatterns from input patterns for training a memory having n-bit address and 1-bit datum (cf. page 144, paragraph 2). D2 (page 145, paragraph 4) suggests to use a sparse state matrix of k memories ( $A_i$ ,  $i=1, \dots, k$ ) followed by a classification matrix (C). Each memory is addressed by a n-bit tuple formed from the input vector and outputs an m-bit word. Collectively, the output from the k memories forms a (kxm)-bit vector S, which is in turn used to access rows of the g-column classification matrix, each column corresponding to a discriminator which has been trained individually. The decision output vector d is formed by bitwise accumulating (i.e. summing) all selected locations in each discriminator. An unknown input pattern is classified as belonging to the discriminator with maximum response. It therefore appears that D1 represents background prior art further away from the invention than D2. However, D2 itself at best only suggests generating a set of tuples from the input pattern (e.g. by means of the sampler of paragraph c) of claim 1). Other elements of the invention are not derivable from D2.

4. The invention as recited in independent claims 1 and 17 consists in a correlation matrix used to store and recognize alphanumeric patterns. The matrix is accessed using combined coded tuples as row (column) addresses, unique separators as column (row) addresses.

Said combined coded tuples are binary vectors obtained by assigning a binary code to each character (cf. fig. 2(a)), selecting groups of n characters (e.g. 2 or preferably 3) covering the input pattern (by means of a n-character-wide window sliding one character at a time along the input pattern), generating for each group the binary tensor product of the character codes, and combining (i.e. ORing) all the binary tensor products obtained for the given input pattern.

It is important to note that each combined coded tuple does not address a single row (column) but in fact a plurality of rows (i.e. all those having a bit set to "1" in the tuple, there being a one-to-one correspondence between rows and bits in the tuple).

Said unique separators are generated pseudo-randomly (various strategies for optimising said pseudo-random generation are described at length in the application) as binary patterns, each uniquely (i.e. biunivocally) associated to its respective input pattern.



Since both said combined coded tuples and said unique separators are used to store the initial data(base) into the correlation matrix, it can be said that an association between each unique separator and its respective input pattern is thereby created /stored (cf. e.g. paragraph g) of claim 1).

When an unknown input pattern (or a part thereof) is provided and transformed into a combined coded tuple as above outlined, it is used as a row (column) address, the stored content of the addressed rows (columns) is summed for all columns (rows), to give an indication of the combined separators that may match the unknown input pattern.

Consequently, the subject-matter set out in the present independent claims 1 and 17, as well as their dependent claims 2-14, 18 and 19, is considered to be novel and non-obvious with respect to the disclosures of the available prior art. It is also evident that the invention is industrially applicable.

The requirements of paragraphs (1) to (4) of Article 33 PCT are thus met.

#### **Re Item VII**

##### **Certain defects in the international application**

5. The last two pages of the description should have been deleted as they add nothing to the disclosure and could, in fact, render the extent of protection uncertain, Article 6 PCT.

The second paragraph of page 34, referring to other unspecified documents, appears to be neither relevant, nor necessary (Rule 9.1(iv) PCT) and should have been deleted.

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
4 January 2001 (04.01.2001)

PCT

(10) International Publication Number  
**WO 01/01345 A1**

(51) International Patent Classification<sup>7</sup>: G06T 1/60

Leonard [GB/GB]; Corner House Farm, Fimber, Driffield,  
Yorkshire YO25 9LY (GB).

(21) International Application Number: PCT/GB00/02303

(22) International Filing Date: 26 June 2000 (26.06.2000)

(74) Agent: STANLEY, David, William; Stanleys, Kings  
Court, 12 King Street, Leeds, Yorkshire LS1 2HL (GB).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

9914876.9

26 June 1999 (26.06.1999) GB

(71) Applicant (for all designated States except US): **UNIVERSITY OF YORK** [GB/GB]; Heslington, York, Yorkshire  
YO1 5DD (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

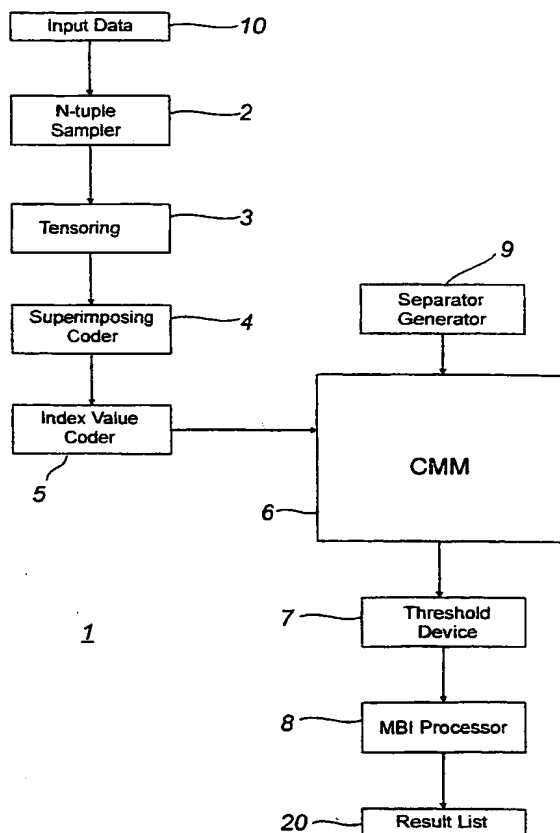
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

(72) Inventor; and

(75) Inventor/Applicant (for US only): **AUSTIN, James,**

[Continued on next page]

(54) Title: DATA PROCESSORS ✓



(57) Abstract: Input means (10) receives sets of input data to be stored in a correlation matrix memory (6). A sampler (2) derives, from each set of input data, a respective set of tuples, and a coder (4) codes each of the tuples, which are then combined for the respective set of input data. A separator generator (9) generates for each set of input data a respective, associated, unique separator, which is stored with its respective set of input data. Addressing means applies to the correlation matrix memory, for each set of input data, the respective combined coded tuples as a row address and the respective unique separator as a column address, or vice-versa.

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IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *With international search report.*

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02303

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06T1/60

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 958 377 A (TAKAHASHI KOUSUKE) 18 September 1990 (1990-09-18) abstract; claim 1; figure 1	1-22
A	EP 0 295 876 A (DIGITAL EQUIPMENT CORP) 21 December 1988 (1988-12-21)	
A	YANG GUOQING ET AL: "Multilayer parallel distributed pattern recognition system model using sparse RAM nets" IEE PROCEEDINGS E (COMPUTERS AND DIGITAL TECHNIQUES), MARCH 1992, UK, vol. 139, no. 2, pages 144-146, XP002146690 ISSN: 0143-7062	

☐ Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

6 September 2000

Date of mailing of the international search report

18/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Pierfederici, A

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02303

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4958377 A	18-09-1990	JP 1883712 C	10-11-1994
		JP 6010809 B	09-02-1994
		JP 63178322 A	22-07-1988
		JP 1985617 C	25-10-1995
		JP 7021957 B	08-03-1995
		JP 63181198 A	26-07-1988
		JP 1883714 C	10-11-1994
		JP 6010810 B	09-02-1994
		JP 63195729 A	12-08-1988
		JP 1042784 A	15-02-1989
		JP 1893724 C	26-12-1994
		JP 6019800 B	16-03-1994
		DE 3801380 A	28-07-1988
EP 0295876 A	21-12-1988	US 5014327 A	07-05-1991
		AU 592704 B	18-01-1990
		AU 1768288 A	15-12-1988
		CA 1312674 A	12-01-1993
		CN 1030833 A, B	01-02-1989
		JP 1088996 A	03-04-1989
		JP 2019474 C	19-02-1996
		JP 7056756 B	14-06-1995
		MX 168768 B	07-06-1993

## PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

STANLEY, David, William  
Stanleys  
Kings Court  
12 King Street  
Leeds, Yorkshire LS1 2HL  
ROYAUME-UNI

Date of mailing (day/month/year) 04 January 2001 (04.01.01)		IMPORTANT NOTICE	
Applicant's or agent's file reference P384WO			
International application No. PCT/GB00/02303	International filing date (day/month/year) 26 June 2000 (26.06.00)	Priority date (day/month/year) 26 June 1999 (26.06.99)	
Applicant UNIVERSITY OF YORK et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:  
AG,AU,BZ,DZ,KP,KR,MZ,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:  
AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,  
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,  
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW  
The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on  
04 January 2001 (04.01.01) under No. WO 01/01345

## REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

## REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38